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Inner plug and cap for liquid injection containers, and jig used to fix cap to inner plug

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(71) Applicant(s)
Yoshino Kogyosho Co., Ltd.

(72) Inventor(s)
Takashi Fujie; Masaru Tamura; Takao Kishi

(74) Agent/Attorney
DAVIES COLLISON CAVE, 1 Little Collins Street, MELBOURNE VIC 3000

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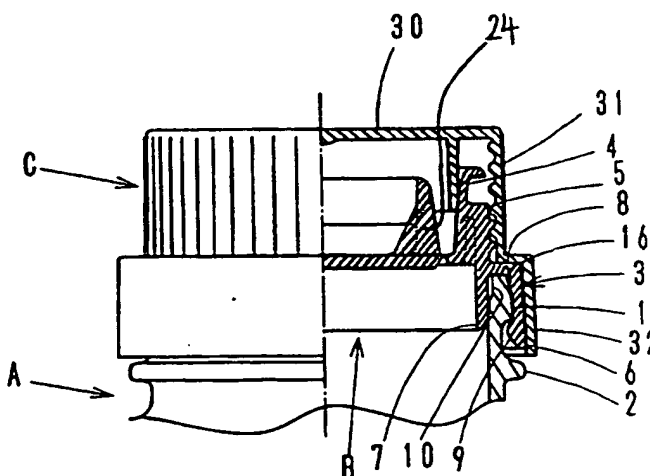
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(54) Title: **INNER PLUG AND CAP FOR LIQUID INJECTION CONTAINERS, AND JIG USED TO FIX CAP TO INNER PLUG**

(54) 発明の名称 液注出容器の中栓とキャップ、及びキャップを中栓に取り付ける際に用いる治具

(57) Abstract

An inner plug constituting a closing member of a liquid injection container formed so that the driven inner plug can be pulled out simply from a mouth portion of the container when the container is discarded, and a cap for closing the inner plug, the closing member of the liquid injection container comprising the inner plug and cap, the inner plug comprising a fitting portion which comprises an inner cylinder, an outer cylinder and a shoulder wall, and which is fitted firmly in a cylindrical mouth section of the container, a threaded cylinder provided so as to extend upward from an inner cylinder of the fitting portion, and an injection cylinder joined to the threaded cylinder, the cap having a side cylindrical wall screwed on the threaded cylinder of the inner plug, and a covering cylinder which is formed so as to have a diameter larger than that of the side cylindrical wall, and which encloses the shoulder wall and outer cylinder of the fitting portion of the inner plug, characterized in that a recess is provided in the outer cylinder of the inner plug, a recess continuing from the recess being provided in the shoulder wall, a deep groove continuing from this recess being provided in a lower surface of the shoulder wall so that the groove extends in a predetermined range along the outer cylinder, and a jig for retaining the inner plug so that the inner plug cannot be turned.



Abstract

The present invention provides an inner plug easily removable from a neck of a container, and a cap for covering the inner plug. The inner plug comprises an engaging portion to be fitted to a neck of the container, a threaded cylinder and a lip cylinder connected to said threaded cylinder. The engaging portion comprises an inner cylinder, an outer cylinder and a shoulder wall. The threaded cylinder is arranged on the inner cylinder. The cap has a side cylinder to be engaged with said threaded cylinder of said inner plug, and a cover cylinder covering said shoulder wall and said outer cylinder. The cover cylinder has a diameter larger than a diameter of said side cylinder. The outer cylinder is provided with a cut portion. The shoulder wall is provided with a cut portion connecting to said cut portion of the outer cylinder. The shoulder wall is provided on a lower surface thereof with a tear off groove along the outer cylinder. The groove is connected to said cut portion of the shoulder wall. Also, a jig for holding an inner plug unrotatably is provided.



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The present invention relates to a cover for a liquid injection container. The invention in particular relates to a cover with an inner plug and a cap for covering the inner plug for the liquid injection container to enable easy removal of the inner plug from the neck of the container after use of the container.

5 It has been encouraged conventionally that for recycling a used liquid injection container, where the container is disposed of as waste, the inner plug and the cap, which are molded from different resin materials to the container, are removed from the neck of the container, and are disposed of separately from the container.

10 There is a problem in that a considerable force is necessary to remove the inner plug because the inner plug is attached to the neck of the container by tapping which cannot be separated easily. Therefore, what usually occurs is that the user disposes of the container with the inner plug.

15 It is therefore desirable to seal the container inside completely, and to have a cover member for the liquid injection container which enables easy removal of the inner plug tapped in the neck when the container is to be disposed of as waste.

Furthermore, to prevent excess wrapping, such conventional liquid injection containers have been sold without a sealed wrapping of the cap.

20 However, in this case, for a liquid injection container provided with cut portions in an outer cylinder and a shoulder wall of the inner plug engaging portion to tear off the outer cylinder enabling removal of the inner plug from the neck of the container easily, it is possible that a person can intentionally remove the cap, open the outer cylinder by pulling the tab portion provided in the outer
25 cylinder to cut the connecting portion and tear off the outer cylinder and then replace the cap. Thus, the container may be tampered with but not noticed until the cap is removed.



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Under the conditions described above, it is desirable for the liquid injection container to be provided with a means of checking from the outside tampering of the container in a shop without removing the cap.

5 One aspect of the present invention provides a cover for a liquid injection container, comprising an inner plug and a cap,

said inner plug comprising an engaging portion to be fitted to a neck of the container, a threaded cylinder, a lip cylinder connected to said threaded cylinder,

10 said engaging portion comprising an inner cylinder, an outer cylinder and a shoulder wall,

said threaded cylinder being arranged on said inner cylinder of said inner plug,

15 said cap having a side cylinder to be engaged with said threaded cylinder of said inner plug, and a cover cylinder covering said shoulder wall and said outer cylindrical portion of said inner plug,

said cover cylinder having a diameter larger than a diameter of said side cylinder,

20 said outer cylinder of said inner plug being provided with a cut portion, said shoulder wall being provided with a cut portion connecting to said cut portion of said outer cylinder,

said shoulder wall of said inner plug being provided on a lower surface thereof with a tear-off groove, said groove extending along said lower surface substantially parallel to the outer cylinder, and

25 said groove being connected to said cut portion of said shoulder wall.

Another aspect of the present invention provides a cover for a liquid injection container, comprising an inner plug and a cap,

said inner plug comprising an engaging portion to be fitted to a neck of the container, a threaded cylinder and a lip cylinder connected to said threaded cylinder,



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said engaging portion comprising an inner cylinder, an outer cylinder and a shoulder wall,

said threaded cylinder being arranged on the inner cylinder,

said cap having a side cylinder to be engaged with said threaded
5 cylinder of said inner plug, and a cover cylinder covering said shoulder wall and
said outer cylinder,

said cover cylinder having a diameter larger than a diameter of said
side cylinder,

said outer cylinder having a connecting portion, and being provided
10 with a cut portion,

said shoulder wall of said inner plug being provided with a cut portion
connecting to said cut portion of said outer cylinder,

said shoulder wall being provided on a lower surface thereof with a
tear-off groove, said groove extending along said lower surface substantially
15 parallel to said outer cylinder,

said groove being connected to said cut portion of the shoulder wall,
and

a lower end of said outer cylinder extending beyond a lower end of the
cylindrical wall of said cap.

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A further aspect of the present invention provides a cover for a liquid injection container, comprising an inner plug and a cap,

said inner plug comprising an engaging portion to be fitted to a neck of the container, a threaded cylinder, a lip cylinder connected to said threaded cylinder,

said engaging portion comprising an inner cylinder, an outer cylinder and a shoulder wall,

said threaded cylinder being arranged on said inner cylinder of said inner plug,

said cap having a side cylinder to be engaged with said threaded cylinder of said inner plug, and a cover cylinder covering said shoulder wall and said outer cylindrical portion of said inner plug,

said cover cylinder having a diameter larger than a diameter of said side cylinder,

said outer cylinder of said inner plug being provided with a cut portion, said shoulder wall being provided with a cut portion connecting to said cut portion of said outer cylinder,

said shoulder wall of said inner plug being provided on a lower surface thereof with a tear-off groove, said groove extending along said lower surface substantially parallel to the outer cylinder,

said groove being connected to said cut portion of said shoulder wall, and

said outer cylinder being provided on its outer surface at a lower end thereof with a flange.



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For easily checking the breakage of the outer cylinder of the engaging portion, the colour of the inner plug may be different from the colour of the cap. For outwardly checking the condition of shoulder wall including the connecting piece of the outer cylinder, the cap may be molded from a transparent or a semitransparent resin.

One object of a preferred embodiment of the present invention is to provide a cover having an inner plug comprising of a cover member tapped in a liquid injection container enabling easy removal from the container neck in disposing the container for waste and having a cap covering the inner plug.

An object of another embodiment of the present invention is to provide a cover with an inner plug and a cap for a liquid injection container enabling a user to check a breakage of the connecting portion of the outer cylinder due to tampering of the goods, without removing the cap.

Preferred embodiments of the present invention will now be described, by way of example only, with reference to the drawings, as set out below.

Fig. 1 is a partially cut rear view of an assembly of a neck of the container and a cover according to a first embodiment of the present invention;

Fig. 2 is a front view of the inner plug according to the first embodiment of the present invention;

Fig. 3 is a plan view of the inner plug according to the first embodiment of the present invention;

Fig. 4 is a section view along line A-A of Fig. 3;

Fig. 5 is a bottom view of the inner plug according to the first embodiment;

Fig. 6 is a partially cut front view of the cap according to the first embodiment;

Fig. 7 is a partially cut rear view of an assembly of a container neck and a cover according to a second embodiment;

Fig. 8 is a front view of the inner plug according to the second embodiment;



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Fig. 9 is a plan view of the inner plug according to the second embodiment;

Fig. 10 is a sectional view of the inner plug along line A-A of Fig. 9;

Fig. 11 is a bottom view of the inner plug according to the second
5 embodiment;

Fig. 12 is a partially cut front view of the cap according to the second embodiment;

Fig. 13 is a partially cut rear view of an assembly of a container neck and cover according to a third embodiment of the present invention;

Fig. 14 is a partially cut rear view of a jig used with the cover;

Fig. 15 is a partially cut front view of the jig of Fig. 14;

Fig. 16 is a perspective view of the jig of Fig. 14;

Fig. 17 is a partially cut rear view of another jig, the inner plug and the
cap;

Fig. 18 is a partially cut-away front view of the jig of Fig. 17 and

Fig. 19 is a perspective view of the jig of Fig. 17.

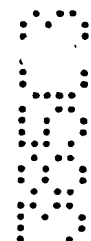
In Fig. 1, "A" illustrates a cylindrical neck of a container, "B" illustrates an inner plug, and "C" illustrates a cap.

These are made of synthetic resin. The inner plug B and the cap C are formed of a different resin from the container.

The neck A of the container is provided with a protruded strip 1 and a protrusion 2 for holding.

As shown in Figs. 2 to 4, the inner plug B comprises an engaging
25 portion 3 for engaging the inner plug with the neck A of the container, a threaded cylinder 5, and a lip cylinder 4 connected to the cylinder 5.

The engaging portion 3 comprises an outer cylinder 6, an inner cylinder 7



and a shoulder wall 8. The cylinder 5 is extended upwardly from the inner cylinder 7.

The outer cylinder 6 is provided with a protruded strip 9 on an inner surface of the outer cylinder at a lower end portion. The strip 9 protruded inwardly, and engaged with the protruded strip 1 provided on an outer surface of the neck A. The inner cylinder 7 is provided with an expanded portion 10 on an outer surface at an upper portion, to form an interference.

When the inner plug B is fitted to the neck, the expanded portion 10 of the inner cylinder 7 is engaged with an inner surface of the neck A of the container, and the strip 9 of the outer cylinder 6 is engaged with a lower end of the strip 1 of the neck A, so as to fit the inner plug B to the neck A of the container.

The inner cylinder 7 tightly contacts with the inner surface of the neck A, and the shoulder wall 8 tightly contacts with an upper end surface of the neck A, so as to seal the container.

At a predetermined portion, the outer cylinder 6 is provided with a cut portion 12 and has a connecting portion 11. The shoulder wall 8 is provided with a cut portion 13 which extends an inner surface of the outer cylinder 6 and which continues to the cut portion 12. These cut portions constitute a tab 14 on circumferential wall of the outer cylinder 6.

A non-slip notch 15 is formed on a surface of the tab 14 to prevent fingers from slipping in case of tearing off.

The shoulder wall 8 is formed with a tear-off groove 16 having substantially V-shaped cross section view in a lower surface thereof. The groove 16 is formed in a range of at least 180° along an inner surface of the outer cylinder 6, and connects with the cut portion 13.

The threaded cylinder 5 is formed with a thread 17 on an outer surface thereof. At an upper end of the threaded cylinder 5, a support wall 18 is continuously formed, and extends inwardly. The lip cylinder 4 extends upwardly from the support wall 18.

At lower side of the support wall 18, a plurality of reinforce ribs 19 are



arranged between the inner surface of the threaded cylinder 5 and the outer surface of the lip cylinder 4, so as to stably support the lip cylinder 4.

The cylinder 4 is formed with a pouring lip 20 which is bent outwardly from an upper end periphery of the cylinder 4. The cylinder 4 is also formed with a partition wall 21 at a lower end thereof.

As shown in Fig. 5, the partition wall 21 is formed with a tear-off groove 22 in a lower surface thereof. A portion of the wall 21 surrounded by the groove 22 can be removed to form a removable portion 23, which acts as an outlet of liquid when the container is used.

As shown in Figs. 1, 3 and 4, a connecting piece 24 extends from an upper surface of the disposable portion 23, and a ring tab 25 is provided at an upper end of the connecting piece 24. Although the connecting piece 24 does not appear along A-A cross section view of Fig. 4, the piece 24 is shown by a dot line in Fig. 4 in order to show a shape of the piece 24.

As shown in Fig. 6, the cap C comprises a top wall 30, a side cylinder 31 and a cover cylinder 32.

The top wall 30 is provided with a sleeve 33 vertically suspended in a lower surface thereof. The sleeve has a ring shape of the cross sectional view. The side cylinder 31 is formed with a thread 34 in an inner surface thereof, and the thread 34 engages with the thread 17 of the cylinder 5 of the inner plug B.

A shoulder wall or a flange 35 is arranged in a lower end of the side cylinder 31, and extends outwardly. A cylindrical wall 36 is vertically suspended from an outer periphery of the shoulder wall 35.

The cover cylinder 32 is formed by the shoulder wall 35 and the cylindrical wall 36, and contacts with the engaging portion 3 of the inner plug B.

When the cap C is threaded and fitted to the inner plug B, an outer surface of the sleeve 33 contacts with an inner surface of the lip cylinder 4 to seal the lip cylinder 4. Also, the cover cylinder 32 contacts with the shoulder wall 8 of the engaging portion 3 of the inner plug B and with an outer surface of the outer



cylinder 6, to cover and fit to the inner plug.

The container is filled with heated and sterilized liquid, and then is cooled by a cooling water.

In this case, since the engaging portion 3 of the inner plug B is covered by the cover cylinder 32 of the cap C, the cooling water is prevented from invading into the container through the cap B, even if the cut portions 12, 13 are provided on the outer cylinder 6 and the shoulder 8 of the portion 3.

In use of the container, the ring tab 25 is pulled upwardly by a finger. The disposable portion 23 of the partition wall 21 is removed along the tear-off groove 22 to form the outlet for pouring the liquid.

When the cap C covers the inner plug B after pouring liquid, since the cover cylinder 32 covers the engaging portion 3 of the inner plug B, the shoulder wall 8 and the outer cylinder 6 of the engaging portion 3 are prevented from the dust in atmosphere, and the cut portion 13 of the shoulder wall 8 is prevented from accumulating dust.

When the used container is wasted or disposed, the tab 14 of the outer cylinder 6 is pulled outwardly, so that the groove 16 formed in the lower surface of the shoulder wall 8 is cut.

When the groove 16 is further cut beyond 180 degree, the engagement of the protruded strip 9 of the outer cylinder 6 with the protruded strip 1 of the neck A is released, so as to decrease an engagement force between the outer cylinder 6 and the neck A. Since the remained engagement force is derived from just the interference between the expanded portion 10 of the inner cylinder 7 and the inner surface of the neck A, the inner plug B can be removed easily.

A second embodiment is illustrated in Figs. 7-12.

In Fig. 7, "A2" illustrates a neck of the container, "B2" illustrates an inner



plug, and "C2" illustrates a transparent or semitransparent cap.

The container, the inner plug B2 and the cap C2 are made of synthetic resins which are different resin one another. The cap C2 is made of a transparent or semitransparent synthetic resin.

The neck A2 of the container is provided with a protruded strip 41 and a protrusion 42 for holding.

Similar to that described in relation to the first embodiment, and as shown in Figs. 8 to 10, the inner plug B2 comprises an engaging portion 43, a threaded cylinder 45 and a lip cylinder 44. The engaging portion 43 comprises an outer cylinder 46, an inner cylinder 47 and a shoulder wall 48.

The outer cylinder 46 is provided with a protruded strip 49 on an inner surface of the outer cylinder at a lower end portion. The strip 49 is protruded inwardly, and engaged with the protruded strip 41 provided on an outer surface of the neck A2. In the second embodiment, a flange 50 is radially outwardly protruded from an outer surface of the outer cylinder 46 at a lower end.

Similar to that described in relation to the first embodiment, when the inner plug is fitted to the neck, an expanded portion 5 of the inner cylinder 47 is engaged with an inner surface of the neck A2 of the container, and the strip 49 of the outer cylinder 46 is engaged with a lower end of the strip 41, so as to fit the inner plug B2 to the neck A2 of the container. The inner cylinder 47 tightly contacts with the inner surface of the neck A2, and the shoulder wall 48 tightly contacts with an upper end surface of the neck A2, so as to seal the container.

As shown in Figs. 8 to 11, the outer cylinder 46 is provided with a cut portion 53, and has a connecting portion 52 at the lower end portion thereof. The flange 50 is also provided with the cut portion. The shoulder wall 48 is provided with a cut portion 54 which extends along an inner circumference of the outer cylinder 46 so as to connect to the cut portion 53. A tab 55 is formed by the cut portions 53, 54 in the circumference wall of the outer cylinder 46. The tab 55 is formed with a non-slip notch 56 in the same manner as the first embodiment.



The shoulder wall 48 is provided with a tear-off groove 57 in a lower surface thereof as well as the first embodiment. The groove 57 has substantially V-shaped cross sectional view. The groove 57 continues to the cut portion 54, and is formed in a range of at least 180° along an inner surface of the outer cylinder 46.

The threaded cylinder 45 is formed with a thread 58 on an outer surface thereof. A support wall 59 extends inwardly from an upper end of the cylinder 45. The lip cylinder 44 extends upwardly from the support wall 59.

The cylinder 44 is formed with a pouring lip 60 which is bent outwardly from an upper end periphery of the cylinder 44. The cylinder 44 is also formed with a partition wall 61 at a lower end thereof.

In the second embodiment, an inner wall 62 is provided on a lower surface of the partition wall 61 aligned and below the lip cylinder 44. The inner wall 62 is formed on an inner surface thereof with a plurality of vertical ribs 63 spaced apart from one another. Each of the ribs 63 extends downwardly to reach a lower end of the inner wall 62.

The partition wall 61 is formed with a tear-off groove 64 in a lower surface thereof. The groove 64 has a reverse V-shaped cross sectional view. A portion of the wall 61 surrounded by the groove 64 can be removed to form a disposable portion 65. A connecting piece 66 extends upwardly from an upper surface of the disposable portion 65, and a ring tab 67 is provided at an upper end of the connecting piece 66.

As shown in Fig. 12, the cap C2 comprises a top wall 70, a side cylinder 71 and a cover cylinder 72. In the second embodiment, the cap C2 is transparent or semitransparent as described above.

Similar to that described in relation to the first embodiment, the top wall 70 is provided with a sleeve 73 downwardly extended from a lower surface thereof. The side cylinder 71 is formed with a thread 74 in an inner circumference thereof. A shoulder wall or flange 75 is arranged at a lower end of the side cylinder 71. A cylindrical wall 76 is downwardly extended from an outer periphery of the shoulder wall 75.



In the second embodiment, length X (Fig. 12) between an upper end and a lower end 77 of the inner surface of the cylindrical wall 76 of the cap C2 is equal to or smaller than length Y (Fig. 8) between an upper surface of the outer cylinder 46 and an upper surface of the flange 50 of the inner plug B2. In the second embodiment, when the cap C2 is fitted to the inner plug B2, the cover cylinder 72 covers an outer periphery surface of the outer cylinder 46 above the flange 50.

The function and effect of the liquid injection container will be described hereinbelow.

In addition to the same function and effect achieved as the first embodiment, the second embodiment has following function and effect.

In a sale of containers filled with liquid contents, even if the connecting portion of the inner plug has already been broken intentionally or accidentally, it can be seen whether or not the container has been tampered with, because the inner plug has the connecting portion 52 at the lower end of the outer cylinder 46 in addition to the flange 50, so that the connecting portion 52 can be observed even if the cap C2 is fitted.

Since the cap is transparent or semitransparent, it can be observed whether or not the groove 57 of the shoulder wall 48 is broken, in addition to any breakage of the connecting portion 52 of the outer cylinder 46.

A third embodiment will be described with reference to Fig. 13.

Although the second embodiment has the flange at the lower end of the outer cylinder of the inner plug, the flange can be eliminated as illustrated in Fig. 13 if the cap is transparent or semitransparent.

In Fig. 13, "B2a" is an inner plug, and "C2" is a cap. The inner plug B2a does not include a flange at a lower end of an outer cylinder 46a. In other words, an outer surface of the outer cylinder 46a of an engaging portion 43a of the inner plug B2a has a diameter same as that of an inner surface of the cylindrical wall 76 of the cap C2. The outer cylinder 46a extends beyond a lower end of the cylindrical wall



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76 of the cap C2 in a range of a height "Z" which corresponds to a height of the flange. Thus, the user can see the connecting portion of the outer cylinder of the inner plug. In addition, since the cap is transparent or semitransparent, the user can see the shoulder wall through the cap.

- 5 If the cap is transparent, the cover cylinder of the cap may be designed to cover the entire outer cylinder, so as to clearly observe the shoulder wall in addition to the connecting portion through the transparent cap.

- 10 Although each of the second and the third embodiments uses the transparent semitransparent cap, the cap may have a colour which is different from that of the inner plug. Since the colour of the cap is different from that of the inner plug, the flange of the outer cylinder can be distinguished from the cap by a different colour, so as to allow a user to easily observe the connecting portion. If the groove is broken and the outer cylinder is removed, the colour of the flange can not be seen, so a user can recognize that such container has
15 been tampered with and is not suitable.

If the colour of the cap is different from that of the inner plug, the flange may be eliminated. It can be easily recognized whether or not a container is suitable as goods, because the colour of the inner plug itself can not be observed.

- 20 A jig for the holding the inner plug of the preferred embodiments of the invention is illustrated in Figs. 14-16.

In particular, the described jig is for holding the inner plug used for fitting the inner plug with the cap (see FIGS. 1-6) according to the above described first embodiment.

- 25 A construction of the jig, and a relationship between the inner plug and the jig will be described hereinbelow.

In Fig. 14, "B" illustrates an inner plug, "C" illustrates a cap, and "D" illustrates a jig for holding the inner plug.

- 30 As illustrated in Figs. 15 and 16 the jig D comprises a base 80 and a holding member 81 erected on the base 80.



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The holding member 81 comprises a column 82 and a cylinder 83 extending upwardly from an outer circumference of the column 82. The column 82 has a same outer diameter as an inner diameter of the inner cylinder 7 of the engaging portion 3 of the inner plug B. The cylinder 83 has a thickness T equal to the space between the lip cylinder 4 and the threaded cylinder 5. The cylinder 83 is formed with a plurality of slits 84 which correspond to the reinforcing rib 19 formed between the lip cylinder 4 and the threaded cylinder 5 of the inner plug B. Each slit 84 has a width equal to the width of each of the reinforcing ribs 19, so that each of the ribs 19 is inserted into each of the slits 84.

After filling liquid in the container, the inner plug of the first embodiment is screwed with the cap, and is then fitted to the neck of the container.

When the inner plug is screwed to the cap C, the inner cylinder 7 of the engaging portion 3 of the inner plug B is inserted in the cylinder 83 of the holding member 81 of the jig, and the reinforcing ribs 19 of the inner plug B are pressed so as to be inserted into the slits 84. An edge of the cylinder 83 is inserted to contact with the support wall 18 of the lip cylinder 4 of the inner plug B, so as to engage the column 82 with the inner cylinder 7.

Thus, the inner plug B is supported on the jig D and is incapable of rotating relative to the jig, so that the cap C can be easily screwed with the inner plug B.

In the jig illustrated, the reinforcing rib 19 is engaged with the slit 84 of the jig D. Alternatively, a number of longitudinal holes having a circular cross sectional shape may be formed between the lip cylinder 4 and the threaded cylinder 5, and a number of longitudinal strips may be projected from the cylinder 83 of the jig D, so as to insert the strips into the holes.

Another jig for screwing and fitting the cap to the inner plug of the second embodiment (see Figs. 7 to 12) is shown in Figs. 17-19.

In Fig. 17, "B2" is an inner plug, "C2" is a cap and "Da" is a jig of the



inner plug.

As shown by Figs. 18 and 19, the jig Da comprises a base 90 and a holding member 91 erected from the base 90 coaxially.

The holding member 91 comprises a holding base 92 and a support step 93.

The holding base 92 has a diameter the same as the inner circumference of the inner wall 62 which downwardly extends from the lip cylinder 44 of the inner plug B2. The support step 93 receives a lower end of the inner wall 62. The holding base 92 is formed on an outer surface thereof with a plurality of vertical grooves 94 equally spaced. Each of the vertical grooves 94 has a width substantially equal to that of the vertical ribs 63 of the inner plug, and extends from an upper end of the holding base 92 to the support step 93.

Each of the vertical ribs 63 on the inner wall 62 of the inner plug B2 are inserted into each of the vertical grooves 94 of the jig Da, and are pushed such that the lower end of the inner wall 62 contacts with the support step 93, so as to fix the inner plug B2 to the holding base 92 of the jig Da.

Therefore, the inner plug B2 is unrotatably held by the jig Da as in the previously described jig, so that the cap C2 can be screwed and engaged to the threaded cylinder 45 of the inner plug B2.

In a further example, the inner plug B2 is formed with the vertical rib 63 at the inner wall 62, and the jig Da is formed with the vertical groove 94 at the holding base 92 as described above. Alternatively, the inner wall 62 may be formed with a slit or a groove, and the holding base 92 of the jig Da may be formed on the surface thereof with a protruding strip which is engaged with the groove.

In place of the slit 84 as shown by Figs. 15 and 16 and of the vertical groove 94 as shown by Figs. 18 and 19, a concave depressed step portion 100 may be formed in an outer periphery 103 on a top surface of the base 80 as shown by a dotted line in Fig. 16. The protruded strip 9 illustrated in Fig. 5 is disposed at the concave depressed step portion 100. The step portion 100 is formed with protrusions



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101, and the protruded strip 9 is formed with notches 102 (Fig. 5), each of which corresponds with each of the protrusions 101. Since the protrusions 101 of the jig are inserted into the notches 102, the jig prevents the inner plug from rotating relative to the jig.

5 The reinforcing ribs 19 in the first jig, the longitudinal hole formed between the lip cylinder 4 and the threaded cylinder 5 in the modified example of the first jig, the vertical rib 63 in the second jig, and the slit or groove in the modified example of the second jig act as the engaging piece, and these are engaged with the jig so as to hold the inner jig unrotatably.

10 In each embodiment described hereinbefore, the cover cylinder of the cap covers the outer cylinder of the engaging portion of the inner plug. However, the inner plug may be applicable for using the cap having no cover cylinder, and in this case, holding members for preventing the rotation are not necessary, and this allows the construction of the jig to be simple.

15 Since the present invention has the above described constructions, the present invention has the following effects.

 In the first embodiment as referred to the inner plug and the cap, since the tear-off groove is formed on the lower surface of the shoulder wall of the engaging portion of the inner plug in a predetermined range along the outer cylinder inner circumference, the tear-off groove can be broken by pulling the tab of the outer cylinder to tear off the outer cylinder circumferential wall along the tear-off groove.

 Therefore the inner plug can be easily removed to dispose the container as waste, separately from the inner plug and the cap.

25 Since the cover cylinder is mounted in the cap to cover the outer cylinder and the shoulder wall of the engaging portion of the inner plug, when cooling the container after heating and filling the contents, there is a reduced risk of cooling water flooding through the cut portion into the container and a reduced risk of dust adhering on the engaging portion of the inner plug during use of the container.



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In the second and the third embodiments, since the cover cylinder of the cap does not cover the flange of the outer cylinder lower end of the inner plug or the lower end portion of the outer cylinder, the connecting portion of the outer cylinder lower end can be observed without removing the cap to check if the container has been tampered with.

Further, then the cap is formed in a transparent or a semitransparent, not only the condition of the connecting portion of the outer cylinder of the inner plug but also of the condition of the shoulder portion can be observed from upside of the cap to check the applicability of the connecting portion and the presence of breakage of the shoulder wall or tampering of the container.

When the colour of the cap is different from that of the inner plug, the outer cylinder of the inner plug can be distinguished from the upside of the cap so as to enable checking of the condition of the connecting portion.

Even if the tear-off groove of the shoulder wall is broken or the outer cylinder is removed, tampering of the container can be immediately recognised by a colourless flange.

As described hereinbefore, the inner plug and the cap of the liquid injection container of the present invention is useful for a closure member to seal the inside of the container, especially as the inner plug can be removed from the container neck easily after using the contents therein, thereby allowing the container, the inner pug and the cap to be disposed of as waste separately.

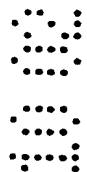
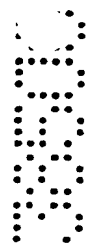
Therefore, the container can be prevented from being mixed in with different kinds of materials, and can be useful for recycling plastic materials.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.



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The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that that prior art forms part of the common general knowledge in Australia.



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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A cover for a liquid injection container, comprising an inner plug and a cap,

5 said inner plug comprising an engaging portion to be fitted to a neck of the container, a threaded cylinder, a lip cylinder connected to said threaded cylinder,

said engaging portion comprising an inner cylinder, an outer cylinder and a shoulder wall,

10 said threaded cylinder being arranged on said inner cylinder of said inner plug,

said cap having a side cylinder to be engaged with said threaded cylinder of said inner plug, and a cover cylinder covering said shoulder wall and said outer cylindrical portion of said inner plug,

15 said cover cylinder having a diameter larger than a diameter of said side cylinder,

said outer cylinder of said inner plug being provided with a cut portion, said shoulder wall being provided with a cut portion connecting to said cut portion of said outer cylinder,

20 said shoulder wall of said inner plug being provided on a lower surface thereof with a tear-off groove, said groove extending along said lower surface substantially parallel to the outer cylinder, and

said groove being connected to said cut portion of said shoulder wall.

25 2. A cover for a liquid injection container, comprising an inner plug and a cap,

said inner plug comprising an engaging portion to be fitted to a neck of the container, a threaded cylinder and a lip cylinder connected to said threaded cylinder,

30 said engaging portion comprising an inner cylinder, an outer cylinder and a shoulder wall,



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said threaded cylinder being arranged on the inner cylinder,
 said cap having a side cylinder to be engaged with said threaded
 cylinder of said inner plug, and a cover cylinder covering said shoulder wall and
 said outer cylinder,

5 said cover cylinder having a diameter larger than a diameter of said
 side cylinder,

said outer cylinder having a connecting portion, and being provided
 with a cut portion,

10 said shoulder wall of said inner plug being provided with a cut portion
 connecting to said cut portion of said outer cylinder,

said shoulder wall being provided on a lower surface thereof with a
 tear-off groove, said groove extending along said lower surface substantially
 parallel to said outer cylinder,

15 said groove being connected to said cut portion of the shoulder wall,
 and

a lower end of said outer cylinder extending beyond a lower end of the
 cylindrical wall of said cap.

3. A cover for a liquid injection container, comprising an inner plug and a
 20 cap,

said inner plug comprising an engaging portion to be fitted to a
 neck of the container, a threaded cylinder, a lip cylinder connected to said
 threaded cylinder,

25 said engaging portion comprising an inner cylinder, an outer cylinder
 and a shoulder wall,

said threaded cylinder being arranged on said inner cylinder of said
 inner plug,

said cap having a side cylinder to be engaged with said threaded
 cylinder of said inner plug, and a cover cylinder covering said shoulder wall and
 said outer cylindrical portion of said inner plug,

said cover cylinder having a diameter larger than a diameter of said



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side cylinder,

said outer cylinder of said inner plug being provided with a cut portion,
said shoulder wall being provided with a cut portion connecting to said

cut portion of said outer cylinder,

5 said shoulder wall of said inner plug being provided on a lower surface
thereof with a tear-off groove, said groove extending along said lower surface
substantially parallel to the outer cylinder,

said groove being connected to said cut portion of said shoulder wall,

and

10 said outer cylinder being provided on its outer surface at a lower end
thereof with a flange.

4. A cover for a liquid injection container according to any one of claims
1, 2, or 3, wherein a colour of the inner plug is different from a colour of the cap.

15

5. A cover for a liquid injection container according to any one of claims
1, 2, or 3, wherein the cap is molded from a transparent or a semitransparent
synthetic resin.

20 6. A cover, substantially as described with reference to the drawings.

DATED this 15th day of October, 2002

Yoshino Kogyosho Co., Ltd.

By DAVIES COLLISON CAVE

25 Patent Attorneys for the Applicant



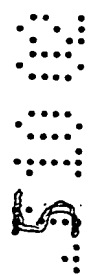
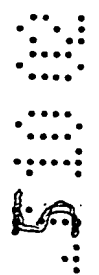


Fig. 3

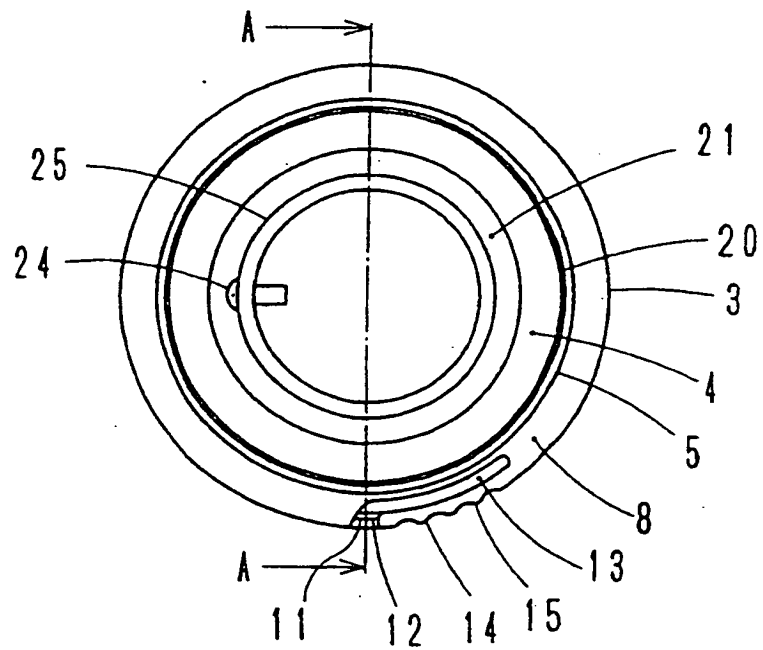


Fig. 4

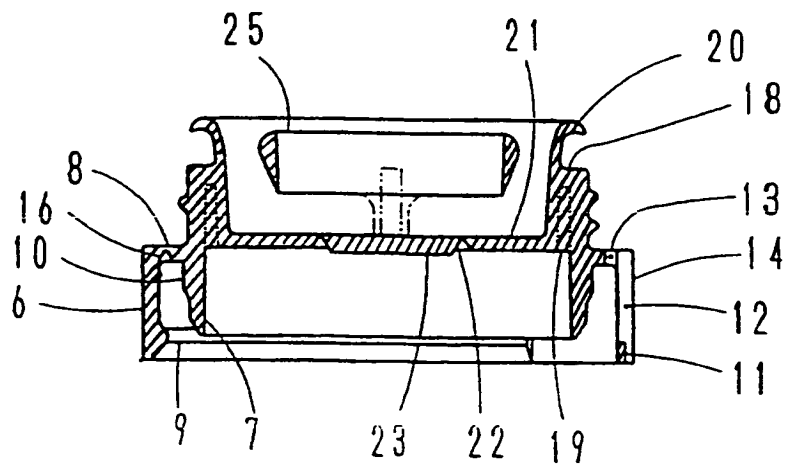


Fig. 5

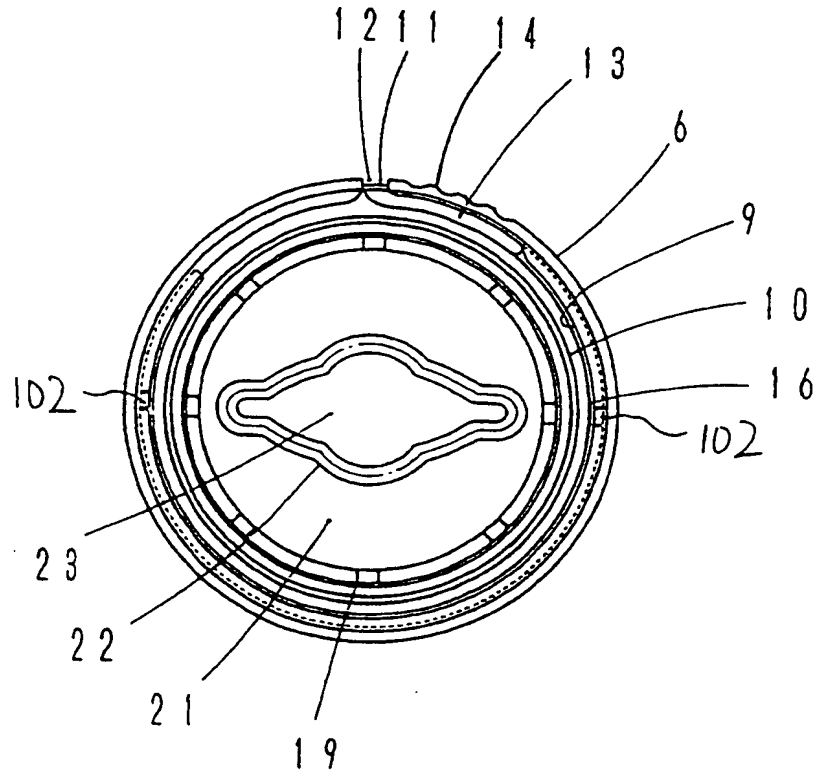


Fig. 6

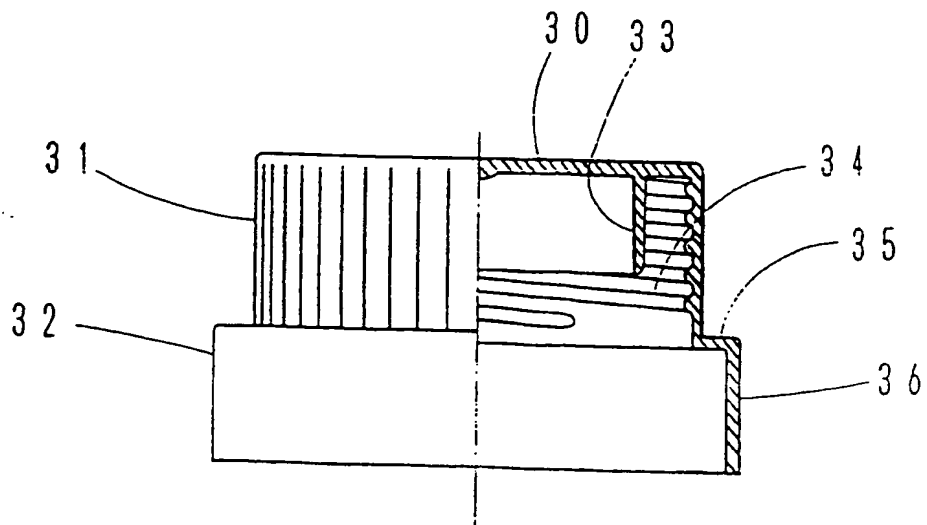


Fig. 7

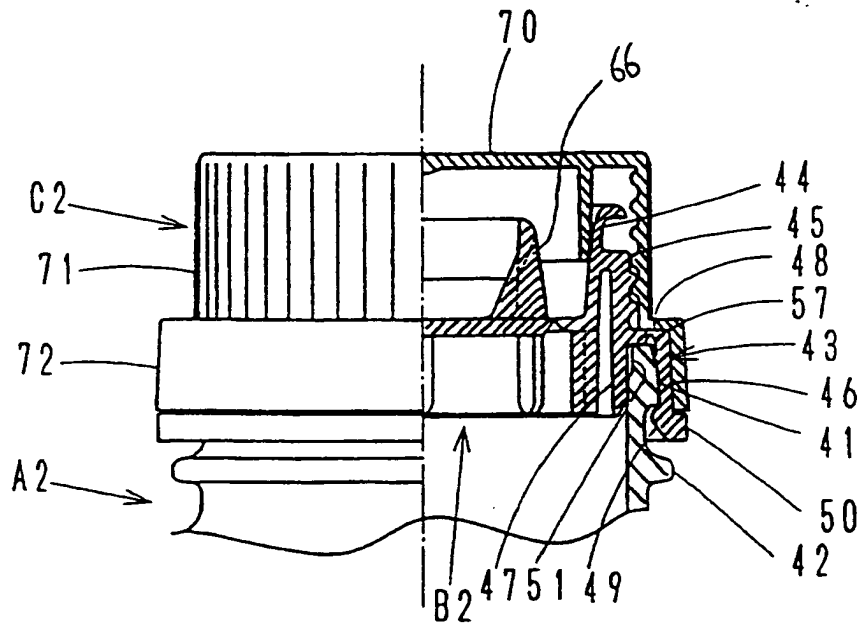


Fig. 8

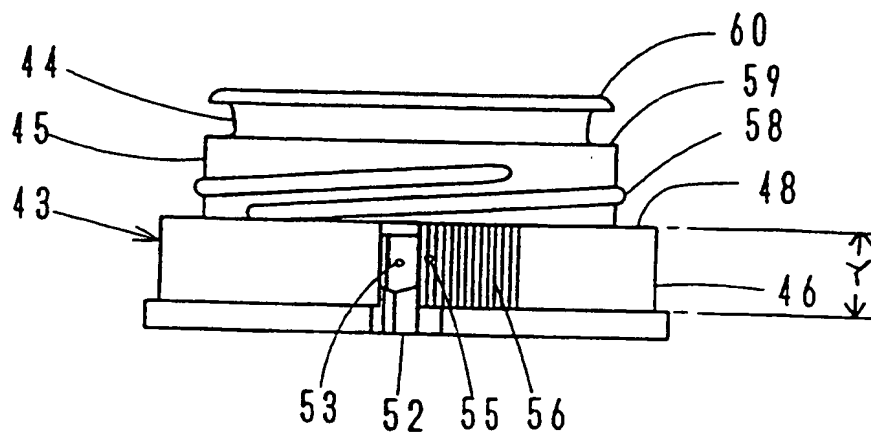


Fig. 9

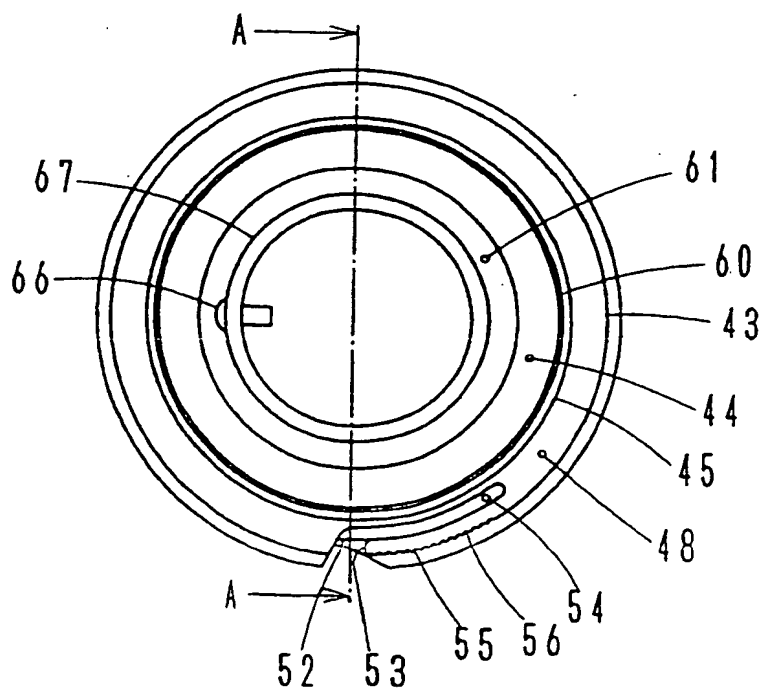


Fig. 10

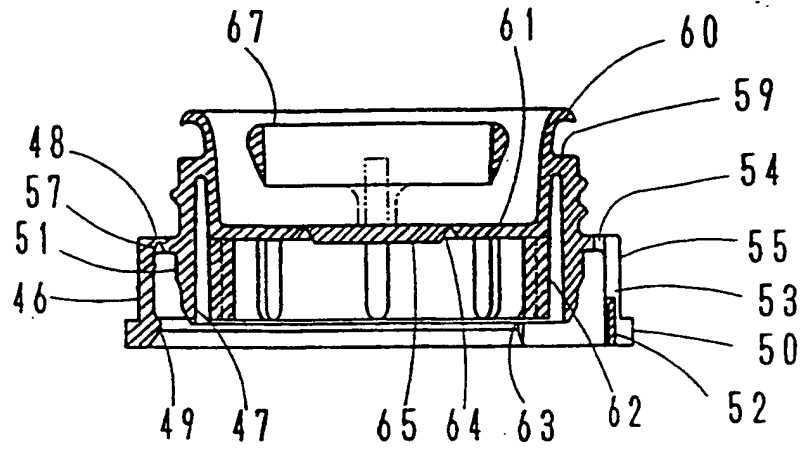


Fig. 11

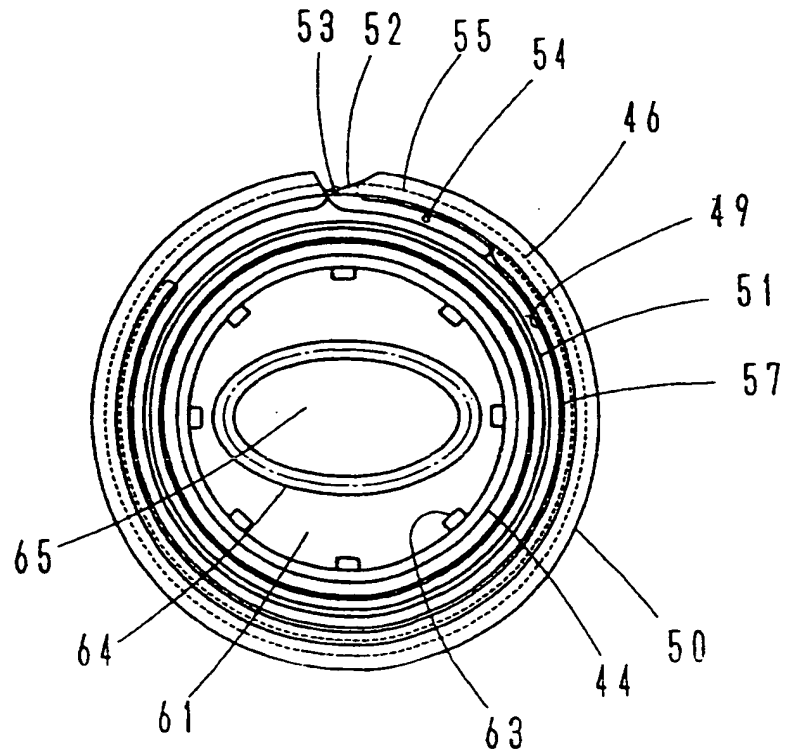


Fig. 12

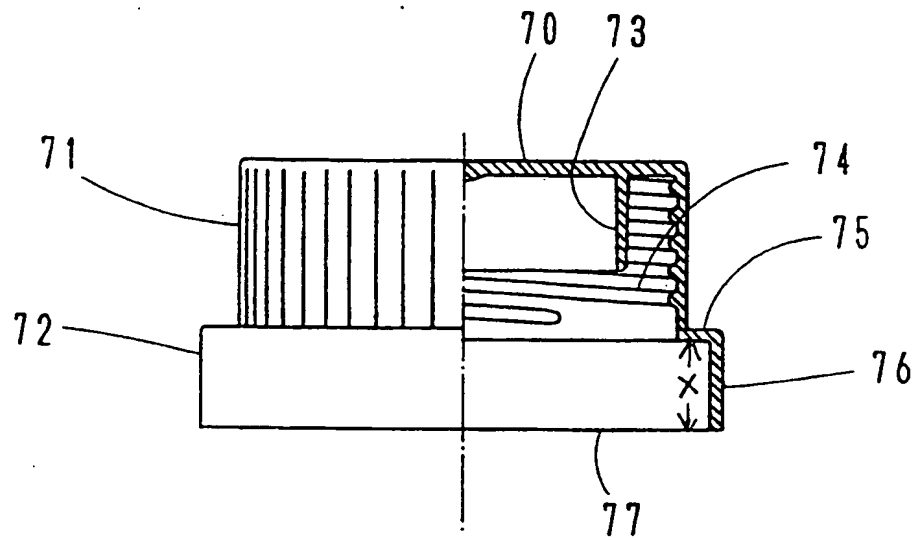


Fig. 13

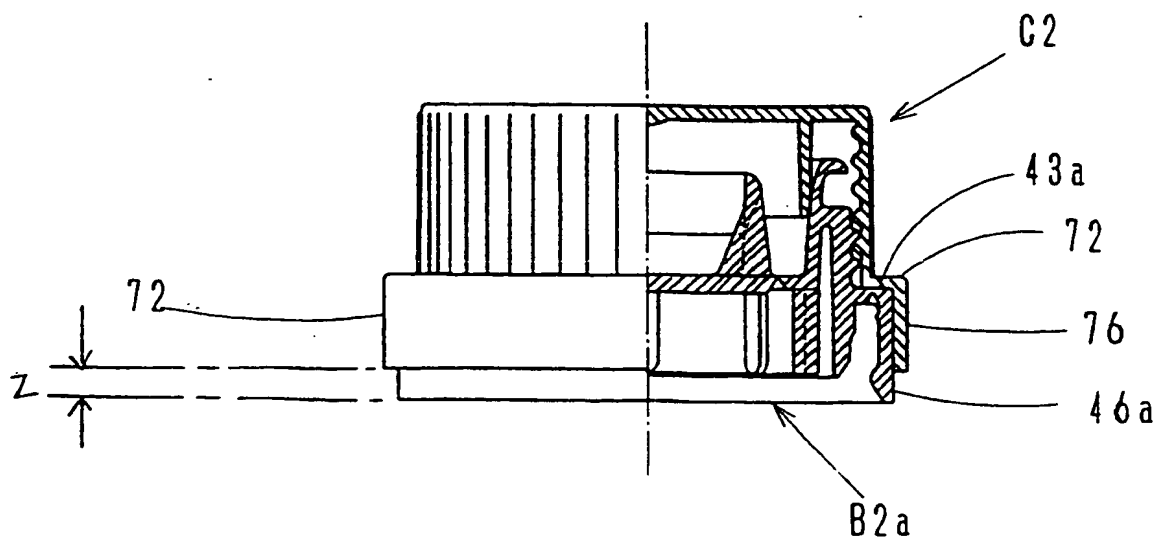


Fig. 14

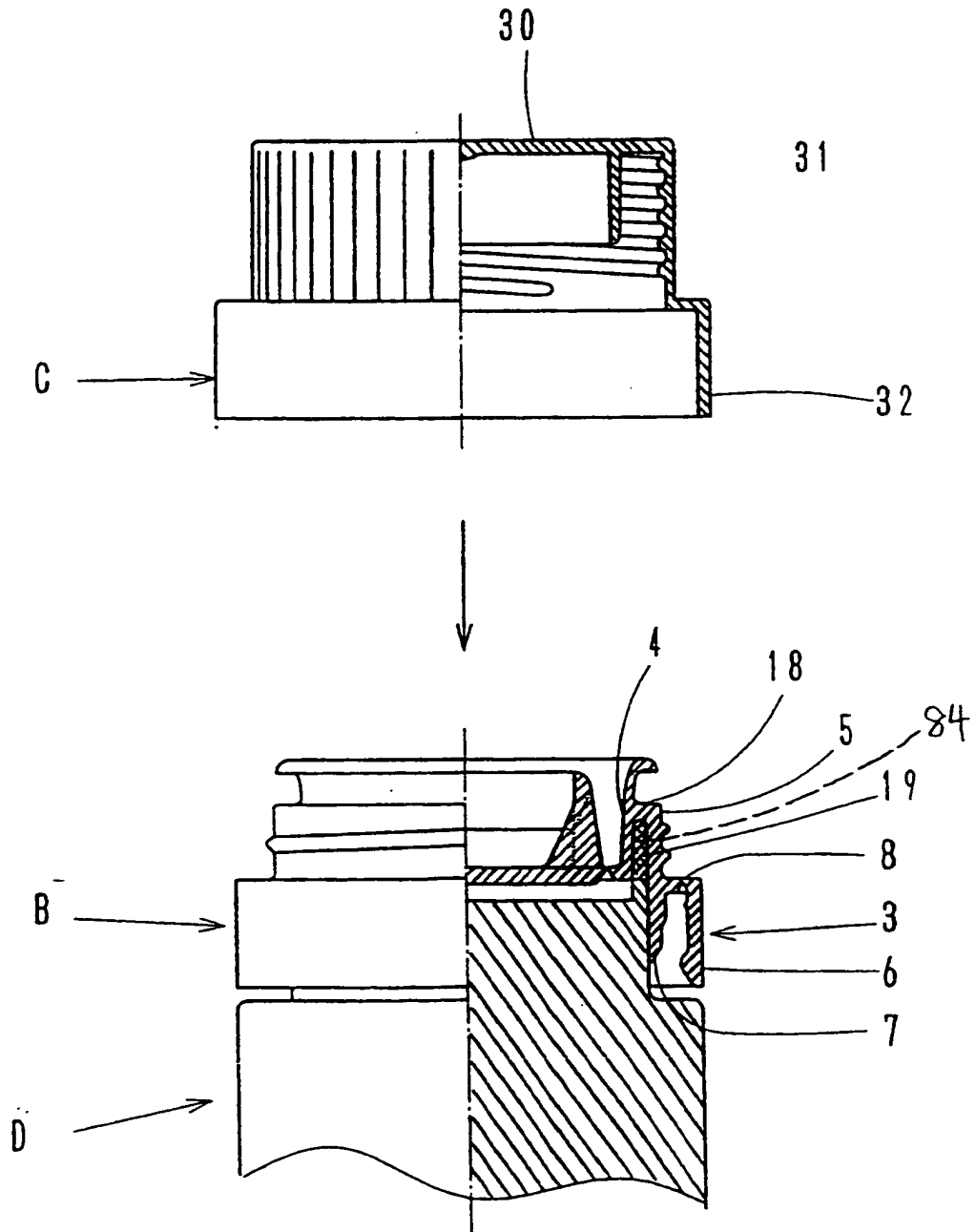


Fig. 5

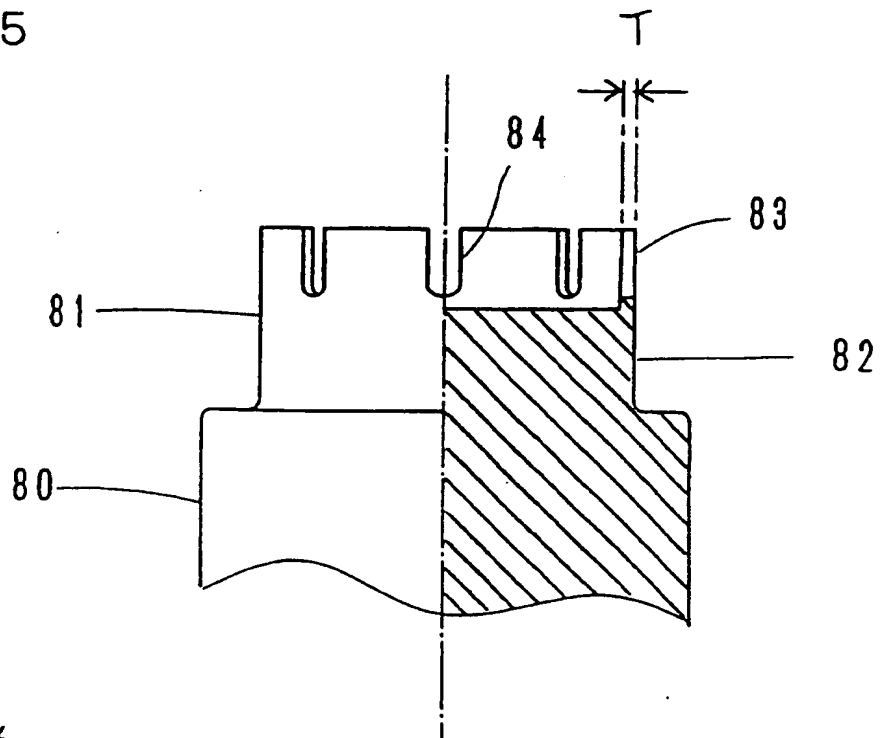


Fig. 16

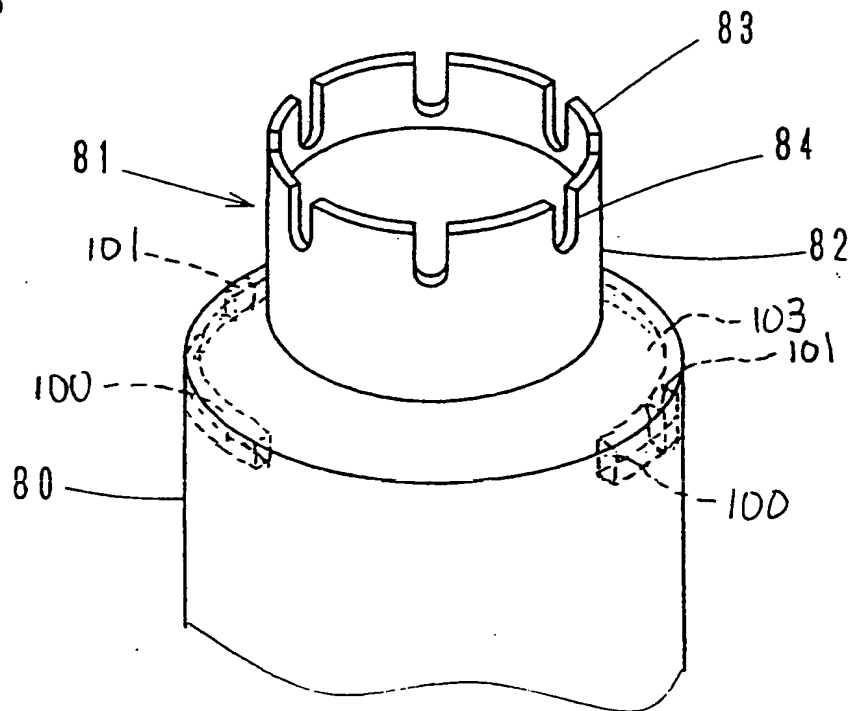
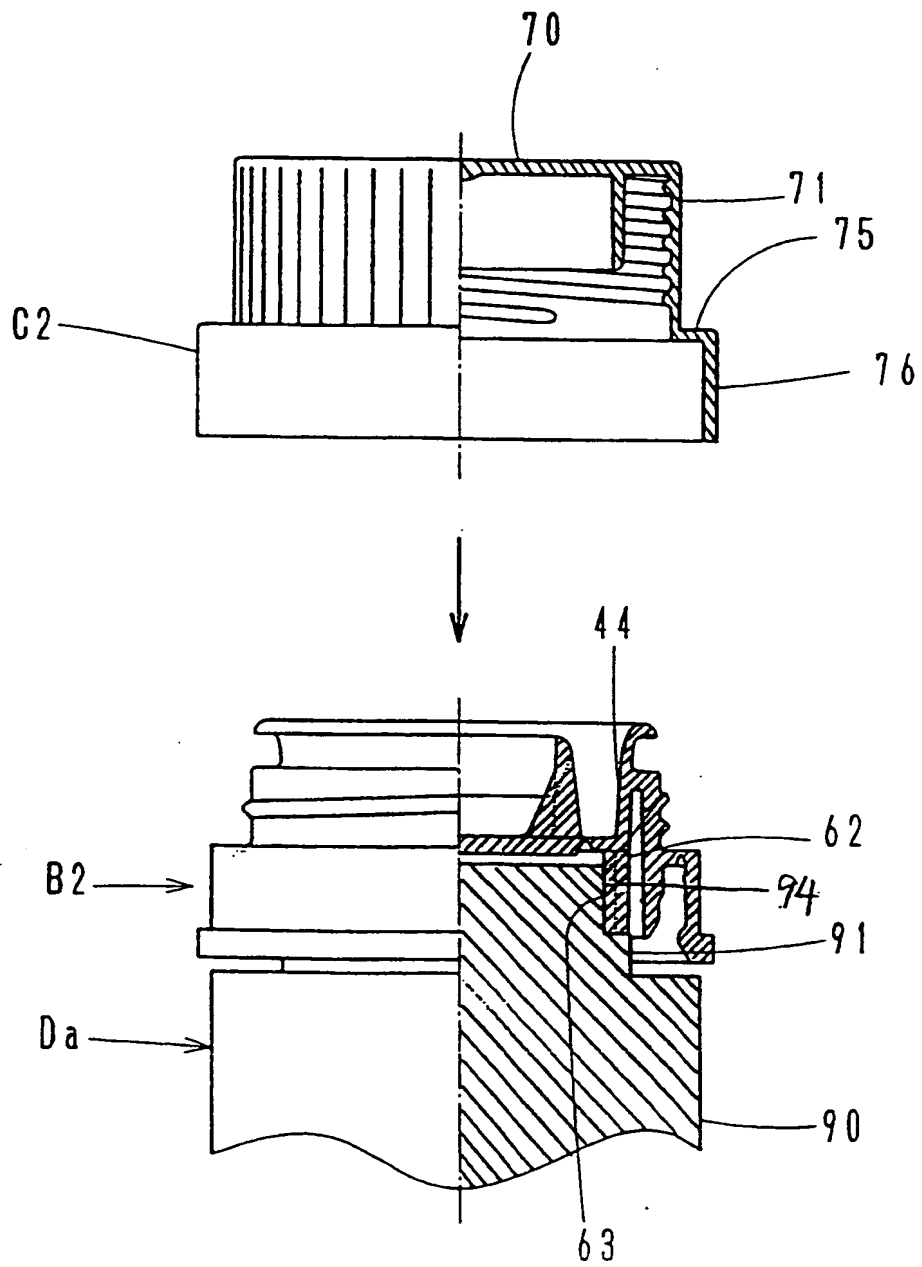


Fig. 17



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Fig. 18

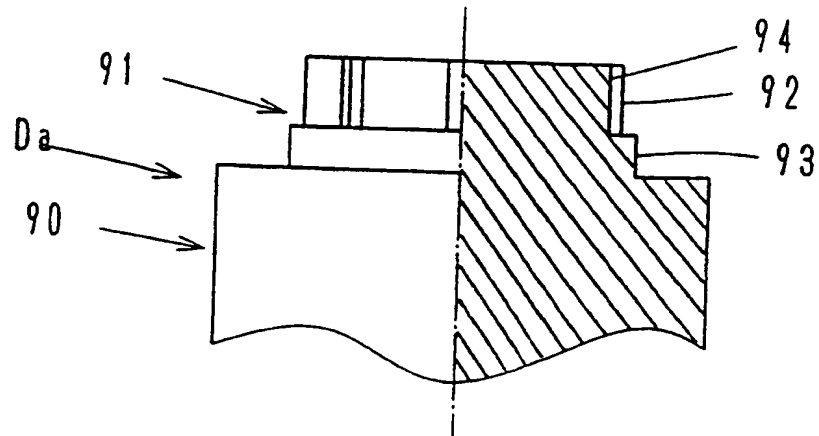
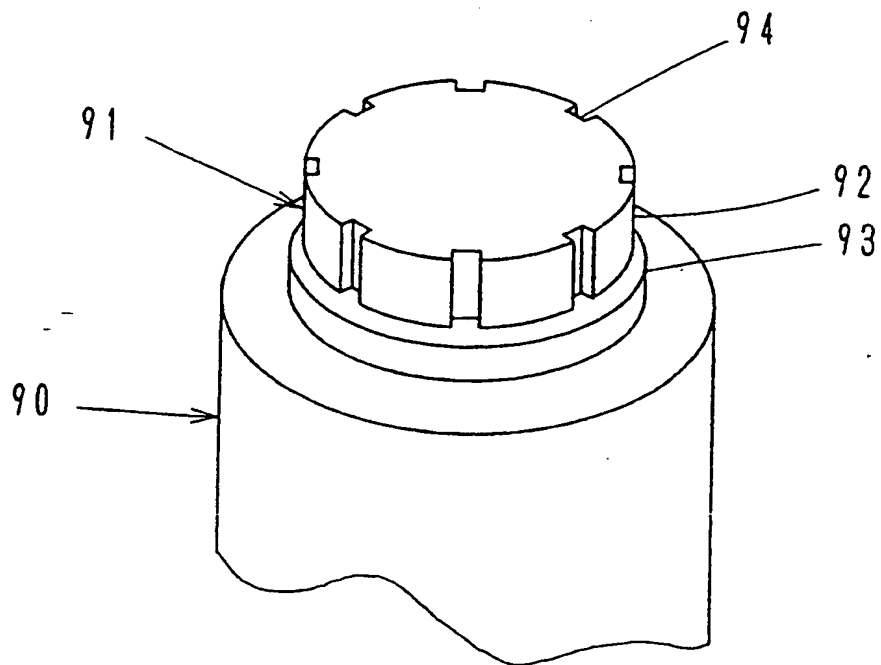


Fig. 19



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